THE EFFECT OF GRADED MONETARY REWARD ON EVENT-RELATED POTENTIALS AND BEHAVIOR: RELEVANCE TO DRUG ADDICTION.

Rita Z. Goldstein, PhD., Lisa A. Cottone[1], M.A., Zhiru Jia[1], M.A., Andreana C. Leskovjan, B.S., Nora D. Volkow, M.D., Nancy K. Squires, PhD [1]

Brookhaven National Laboratory; State University of New York at Stony Brook[1]

ABSTRACT

Drug addiction is characterized by poor inhibitory control and compromised processing of the salience of rewards. This study examined the effect of stimulus salience on event-related potentials (ERPs) and behavior using a response inhibition paradigm in 16 healthy participants. ERPs were recorded from 64 channels while subjects performed a warned reaction time Go/No-Go task where the warning stimulus signaled whether a response was required to the subsequent target stimulus. Monetary reward conditions (0 cent, 1 cent and 45 cents) were varied across blocks of trials. A contingent negative variation (CNV) was observed between the warning and target stimuli. The mean amplitude of the late portion of the CNV was significantly larger after Go stimuli than No-Go stimuli, but was unaffected by monetary reward. In contrast, the peak amplitudes of the P3 component to the warning and target stimuli were significantly larger in the 45-cent condition than in the 0-cent and 1-cent conditions. This effect corresponded with subjective ratings of interest and excitement about the task. There were no significant differences in the sensory ERPs or behavioral measures (reaction time and number of errors) as a function of monetary reward. These findings suggest a role for the P3 component in salience attribution that cannot be attributed to differences in performance. The P3 component and not the CNV might contribute to the differential activation of the corticolimbic reward network by rewards such as money or drug cues in individuals with drug addiction.

Descriptors: ERP, Go/No-Go, Monetary Reward, Contingent Negative Variation (CNV), P3, Inhibition, Motivation, Drug Addiction, Salience Attribution, Inhibitory Control